

WHAT IS CLAIMED IS:

1. A wavelength division multiplexed optical amplifier provided with:

a first-stage optical amplifying unit and a second-stage optical amplifying unit arranged in series with respect to an optical signal,

a common automatic gain control circuit for automatic gain control by the optical signals at an input end and output end of said first and second-stage optical amplifying units, and

a pumping light distribution function unit for receiving a control signal from said common AGC circuit and supplying pumping light to said first-stage optical amplifying unit and second-stage optical amplifying unit with a predetermined distribution ratio.

2. A wavelength division multiplexed optical amplifier as set forth in claim 1, wherein said pumping light distribution function unit is comprised of a single pumping light source and an optical coupler for splitting pumping light from said single pumping light source with a predetermined distribution ratio and supplying the light to said first-stage optical amplifying unit and second-stage optical amplifying unit.

3. A wavelength division multiplexed optical amplifier as set forth in claim 1, wherein said pumping light distribution function unit is comprised of a first pumping light source for pumping said first-stage optical amplifying unit, a second pumping light source for pumping said second-stage optical amplifying unit, and a driving unit for driving said first and second pumping light sources to match said predetermined distribution ratio.

4. A wavelength division multiplexed optical amplifier as set forth in claim 1, wherein said pumping light distribution function unit performs forward and backward pumping by adding backward pumping to said first-stage optical amplifying unit while, said pumping

light distribution function unit applies forward pumping to said second-stage optical amplifying unit.

5. A wavelength division multiplexed optical amplifier as set forth in claim 1, wherein said predetermined distribution ratio is made a value giving a gain increased near the upper limit where oscillation occurs in said first-stage optical amplifying unit so as to obtain a low noise figure.

6. A wavelength division multiplexed optical amplifier as set forth in claim 1, wherein said predetermined distribution ratio is made a value enabling fluctuation of output at said output end due to ASE to be suppressed when the number of input wavelengths of the optical signal received at said input end rapidly decreases.

7. A wavelength division multiplexed optical amplifier as set forth in claim 1, wherein said amplifier is provided with at least three stages of optical amplifying units including an additional optical amplifying unit arranged in series with said optical signal and two of said optical amplifying units are made said first-stage optical amplifying unit and said second-stage optical amplifying unit.

8. A wavelength division multiplexed optical amplifier as set forth in claim 1, further provided with a distribution ratio control function unit able to change said predetermined distribution ratio.

9. A wavelength division multiplexed optical amplifier as set forth in claim 8, wherein said distribution ratio control function unit is an optical attenuator able to change the intensity of said pumping light.

10. A wavelength division multiplexed optical amplifier as set forth in claim 1, wherein an optical amplifying medium forming each optical amplifying unit is a rare earth-doped fiber or optical waveguide.

11. A wavelength division multiplexed optical

amplifier as set forth in claim 7, wherein an optical amplifying medium forming each optical amplifying unit is a rare earth-doped fiber or optical waveguide.